

XXXVII.—Description of a new Species of Satyrid Butterfly from Costa Rica. By H. GROSE SMITH, B.A., F.E.S., F.Z.S., &c.

Oxeoschistus cothonides.

Male.—*Upperside.* Anterior wings resemble *O. cothon*, Salvin. Posterior wings, discal area bright tawny, with a broad marginal border of dark brown, irregularly indented by the tawny area between the veins; a dark brown spot centred by a white dot situate in the tawny area between the two lowest median nervules, and two similar contiguous spots above the anal angle, as in *O. cothon*. The discal area becomes darker tawny brown towards the base and inner margin, the darker area extending transversely from the middle of the costa and crossing the cell a little beyond its middle towards the anal angle, where it merges in the dark brown marginal border. The female resembles the male.

The *underside* does not differ appreciably from *O. cothon*.

Hab. Cartago, Costa Rica.

Expanse of wings $2\frac{1}{2}$ inches.

Described from one male and two female specimens. At first I thought this insect might be the female of *O. cothon*; but there being both sexes in the collection, and possessing a female of *O. cothon* which does not differ from the male, I conclude that the very distinct colouring of the upperside of the posterior wings justifies me in describing it as distinct from *O. cothon*. The specimens were sent by Mr. Underwood with a good series of *O. cothon* from the same locality.

XXXVIII.—On Mammals from Celebes, Borneo, and the Philippines recently received at the British Museum. By OLDFIELD THOMAS.

THE specimens referred to in the present paper were mostly collected by Messrs. Charles and Ernest Hose in N. Celebes and by Mr. Alfred Everett at the extreme south of the same island, and both at about the same date, October to December 1895. One of the chief objects of these naturalists was to obtain for our National Museum specimens of the numerous small mammals that have been described of late years from the island of Celebes and have hitherto been unrepresented in the British Museum. This object has

happily been very successfully accomplished, and Celebes is now no longer the worst-represented part of the world in the Museum collections, as was formerly the case—an improvement wholly due to those who have already made Northern Borneo the best-represented part of the world in the same collections.

In spite of the many Celebean species previously described, most of which have now been obtained, no less than five new ones have also been discovered—a result the more surprising as the Hoses were working in what was supposed to be the best-known part of Celebes.

Besides the Hose and Everett specimens, a bat obtained by Governor Creagh at Sandakan, N. Borneo, is also described, as also is a very remarkable new fruit-bat which occurs in Mr. John Whitehead's last collection from the Philippines.

Boneia menadensis, sp. n.

Size of *Boneia bidens*, Jent. Ears of medium length, sharply pointed above, their outer edge with a small lobule basally. Wings from the sides of the back as in typical *Xantharpyia*. Colour above of head dark smoky brown, of nape dull yellow, of back dark reddish brown, gradually becoming paler and brighter on the rump. Sides of neck with dark golden gland-tufts. Chin, throat, and belly pale greyish brown. Wings and limbs naked, except just on the proximal part of the forearm and on the femora and neighbouring parts of the interfemoral membrane.

Skull with a broad heavy muzzle and strong widely expanded zygomata. Premaxillæ separated in front.

Upper incisors two in number, short, cylindrical, equidistant from each other and the canines. Canines long, grooved in front. First upper premolar small, but not specially crushed in between the canine and second premolar. Lower incisors in an even curved row between the canines, the outer four or five times as stout as the inner ones. Canines short, stout, and strongly slanted outwards.

Dimensions of the type (an adult male skin):—

Forearm 97 millim. (=3·8 inches); head and body (approximate) 153; ear (dried) 20; lower leg 53.

Skull: extreme length from nasion to occiput 43·7; greatest breadth 25; tip of nasals to supraorbital foramina 20; interorbital breadth 7·5; tip to tip of postorbital processes 16; front of upper canine to back of $\underline{m.2}$ 15·1.

Hab. Menado, Celebes.

Coll. C. and E. Hose, Oct. 1895.

This bat is probably the N. Celebes representative of the southern *B. bidens*, from which it may be distinguished by the distance between the dorsal origins of the wings, its pointed ears, and different colour, notably the brown instead of "golden-yellow" crown.

HARPYIONYCTERIS, gen. nov.

Index with a claw. Wings from the sides of the hairy back, inserted behind at the junction of the first and second toes. No tail. Hind limbs apparently very short. Interfemoral membrane obsolete, buried in thick fur.

Dentition.—I. $\frac{1}{1 \text{ or } 0}$, C. $\frac{1}{1}$, P. $\frac{3}{3}$, M. $\frac{2}{3} \times 2 = 28$ or 30.

Upper incisors large, touching each other and the canines, shaped, when viewed in front, almost like those of *Desmodus*, each with a long oblique cusp touching its fellow in the middle line of the skull, but in section each is broadly triangular, with a broad posterior basal ledge. Canines with a large posterior secondary cusp about half as high as the main cusp, and with a broad postero-internal basal ledge, but no additional internal cusps; its direction much more slanting forwards than usual, as is the lower canine also, so that the two cross each other nearly at right angles, instead of being approximately parallel. First two premolars about as in *Cynopterus*. Molars oblong in section and of a peculiar cuspidate character, the lateral longitudinal walls to the usual median groove broken up into several minute cusps, none of which are at all specially lengthened. Below, the incisors are practically obsolete, being minute and almost crowded out* by the large canines, which touch each other in the middle line, and each have an antero-internal and a postero-external secondary cusp and a broad posterior ledge.

It is difficult to say with certainty to what previously known genus this remarkable form is most nearly allied. Its peculiar canines to a certain extent recall those of *Harpyia*, but this resemblance may be either accidental or due to their common descent from the (presumably) cuspidate-toothed ancestors of the Pteropodidæ†. On the whole it may be most conveniently placed near *Xantharpyia* and *Boneia*, with which it shares certain external characters, an indical claw, and the cheek-tooth formula of P. $\frac{3}{3}$, M. $\frac{2}{3}$; but the

* In the single type specimen one lower incisor only is present, the other having fallen.

† See P. Z. S. 1888, p. 473.

unique incisors, the short bi- and tricuspidate canines, and the multicuspidate molars separate it widely even from these, and render it one of the most isolated of all the genera of the group.

Harpyionycteris Whiteheadi, sp. n.

Size about as in *Xantharpyia amplexicaudata*. Fur soft, close and woolly, especially posteriorly. General colour of the fur all over above and below a uniform chocolate-brown, a little darker on the face, and a little lighter on the nape and shoulders. Wing-membranes dark, with a few whitish spots scattered about them. Ears of medium length, rounded at their tips. Fur of the back extending thinly on to the fore-arms and covering the hind limbs densely down to the roots of the claws. Interfemoral membrane barely a tenth of an inch wide, wholly buried in the fur.

Dimensions of the type (an adult skin of doubtful sex):—

Forearm 84 millim. (=3·3 inches); head and body 140; ear 17; index-finger and claw 60; third finger, metacarpal 59, first phalanx 44, second phalanx 54.

Skull: basal length 37·5; greatest breadth 23·8; inter-orbital breadth, tip to tip of postorbital processes 6·9. Front of canine to back of m_2 17.

Hab. Mindoro, Philippines, alt. 5000 feet.

Coll. J. Whitehead, December 1895.

Mr. Whitehead is to be congratulated on this interesting addition to the splendid discoveries he has already made in the Philippine Islands.

Rhinolophus Creaghi, sp. n.

Size medium. Nose-leaf widely different from that of any other species by the fact that while usually, in Dobson's words, the upper margin of the connecting process of the sella is conjoined with the summit of the vertical process at the same level, or exceeds it posteriorly in height, in the present species the connecting process is almost obsolete and is far overtopped by the anterior vertical process. Above the low connecting process, on the front face of the sella, there is a prominent tuft of brown hairs, projecting forwards and overhanging the anterior vertical process. The latter process is spatulate, narrower below, broadening out in the middle, pointed above. Internarial lappets rounded. Horizontal nose-leaf broad, just about covering the muzzle. Lower lip with three grooves. Ears large, sharply pointed

at their tips. Wings from the tibiæ nearly half an inch from the ankle. Colour, as usual, dull brown above and below.

First upper premolar between the well-separated canine and second premolar. Second lower premolar entirely absent.

Dimensions of the type (an adult female in spirit):—

Forearm 49 millim. (=1.95 inch); head and body 51; tail 17.5; ear from notch 22; nose-leaf 15×10; lower leg 23.

Hab. Sandakan, British N. Borneo.

Presented and collected by Governor C. V. Creagh, C.M.G., in whose honour I have ventured to name the species.

This very interesting bat differs from all the ordinary members of the genus both by the absence of the second lower premolar and by the characters of its nose-leaf, in which latter respect it shows a certain tendency towards the unique and peculiar *Rh. cælophyllus*, Peters. To the best of my belief, no species as yet described resembles *Rh. Creaghi* closely enough to need detailed comparison with it.

Felis domestica, L.

With the various remarkable Murines sent by Mr. Whitehead from Luzon in 1895 there was a cat found living wild at a considerable altitude in the mountains. As it was possible that this was a domestic cat run wild, it was put aside for further evidence on the subject. Now, again, Mr. Everett sends from Mount Bonthain, S. Celebes, a cat obtained at 6500 feet which precisely agrees in every respect with Mr. Whitehead's Luzon animal. On comparing these two mountain skins with two specimens obtained at Makassar by Wallace, and considered ever since as *F. domestica*, I find there is just the difference which might be expected to occur between tame and feral individuals. Indeed, one of Wallace's is almost precisely like Everett's, while the other is obviously a domesticated specimen, and the comparison of the whole series shows conclusively that the mountain-cats both of Luzon and Celebes must be regarded as feral individuals of the ordinary Malay domestic cat. The same conclusion is to be drawn from the skulls, which agree very closely with those of the domestic cat, while quite different from those of *Felis chaus*, to which, if a genuine wild species, the Luzon and Celebes cat would by its colour be most nearly affined.

Among the Muridæ obtained by Messrs. C. and E. Hose the following known species occur, most of them having been previously unrepresented in the Museum collection:—*Mus*

Hellwaldi, Jent., *M. Musschenbroeckii*, Jent., *M. Meyeri*, Jent., *M. celebensis*, Gray, *M. xanthurus*, Gray, *M. callitrichus*, Jent., *M. neglectus*, Jent. (?), *M. ephippium*, Jent., and *Craurothrix** *leucura*, Gray. The skins of the last-named quite agree with the type of "*Echiothrix leucura*," and confirm Dr. Jentink's record of Celebes as the true locality of this remarkable rat.

In addition to these, two new species of *Mus* were obtained, whose descriptions follow:—

Mus fratrorum, sp. n.

Size about as in *Mus rattus*. Fur of medium length, soft, without longer bristles intermixed. Ears large, evenly rounded. General colour above brownish grey, finely sprinkled with dull yellowish. Head rather paler, but the circumference of each eye slightly darker. Under surface dirty greyish yellow, the bases of the hairs slaty grey, their tips dull yellowish; line of demarcation on sides little marked. Hind feet rather elongate; fifth hind toe reaching to the middle of the first phalanx of the fourth; upper surface of hands and feet silvery white. Tail somewhat shorter than head and body, finely scaled (about 11 scales to the centimetre), its proximal two thirds above brown, its end and the whole of its under surface white.

Skull with rather a small cranial and long facial portion. Supraorbital beads distinct, although not strong. Front of zygoma-root little projected forwards. Anterior palatal foramina of medium length, not reaching back to the level of $\underline{m.1}$. Molars large and heavy. Bullæ small.

Dimensions of the type (an adult male in skin):—

Head and body 193 millim.; tail 157; hind foot (moistened) 38·8; ear 20.

Skull: basal length 37·5; basilar length to henselion 34·3; greatest breadth 21·2; nasals 19·4 × 4·6; interorbital breadth 6·4, interparietal 5 × 9·5; diastema 12; palate length from henselion 19·2; palatal foramina 7·4 × 3·2; length of upper molar series 7·6; breadth of palate outside $\underline{m.1}$ 9·2, inside $\underline{m.1}$ 4·5.

Hab. Rurúkan, Celebes, 3500 feet.

Coll. Charles and Ernest Hose.

Type killed Oct. 8, 1895.

* *Nom. nov.*

Echiothrix, Gray, P. Z. S. 1867, p. 599, *nec*

Echinothrix, Peters, MB. Akad. Berl. 1853, p. 487 (Echinodermata).

Besides the type, there are several other specimens from Rurúkan, two from Menado, and one from Mount Masarang.

This species is apparently most closely allied to *M. chryso-comus*, Hoffm., also a native of Celebes, but differs from it by its larger size, beaded supraorbital edges, and much heavier molars.

Mus minahassæ, sp. n.

General appearance that of the *Mus Margarette* of Sarawak, but the structure of the feet quite as in normal *Mus*. Size small. Fur long and soft. Ears of medium length. General colour above rufous, duller on the back, brighter on the sides. Under surface white, bases of the hairs grey; line of demarcation on sides well-marked. Metapodials brown, fingers and toes whitish. Thumb with a large nail, other digits with short, sharp, curved claws. Hallux not opposable, with a claw, reaching without its claw to the base of the second toe; fifth toe reaching to the middle of the second phalanx of the fourth. Soles naked; pads apparently six in number as usual, not striated, the posterior one elongated. Tail long, slender, very finely scaled (23–25 scales to the centimetre), short-haired (the extreme tip is gone, but there is no sign of the commencement of a terminal pencil), uniformly brown above and below.

Skull suggesting that of *Chiropodomys* by its proportionally large brain-case and small face. Muzzle short and slender. Interorbital region narrow, flat above, its edges square, faintly beaded; parietals large, convex; interparietal large; zygomata very weak and slender, greatest breadth of skull just at their posterior roots; anterior zygoma-root not projected forwards. Palatal foramina small. Molars short, broad and rounded.

Dimensions of the type (an adult female in skin):—

Head and body 77 millim.; tail (extreme tip gone) 105; hind foot (moistened) 20; heel to front of last foot-pad 9·3; ear (dried) 12·7.

Skull: basal length 18·6; basilar length from henselion 17·2; greatest breadth 12·3; nasals 7·1 × 2·5; interorbital breadth 3·8; brain-case, length 13·2, breadth 11·8; interparietal 4·5 × 8·5; diastema 6·1; anterior palatal foramina 2·9; length of upper molar series 3·2.

Hab. Rurúkan, Minahassa, N. Celebes.

Coll. Charles and Ernest Hose, November 1895.

This very pretty little mouse is readily distinguishable from all others by its *Chiropodomys*-like appearance and skull, combined with its strictly *Mus*-like hands and feet.

In South Celebes and the Saleyer Islands, besides several desiderata to the Museum collection, Mr. Everett obtained examples of the two following new species :—

Mus celestis, sp. n.

Size rather less than *Mus fratorum*. Fur long and soft, hairs of back about 18 millim. in length; no longer bristles intermixed.

Muzzle unusually long, cylindrical. Eyes small. Ears large, rounded, laid forward in a spirit-specimen they reach to the anterior canthus of the eye. Palate-ridges 3-5. General colour above rich rufous brown (perhaps, in a bright light, nearest to Ridgway's "hazel"), the hairs dark slate for the greater part of their length and just tipped with rufous. The belly is also of much the same colour, only lighter, and the line of demarcation on sides is quite imperceptible.

Fore feet with the dark colour extending on to the metacarpals, fingers white; claws exceptionally long and strong, little curved, quite different to those of ordinary rats. Hind feet similarly coloured to the fore; claws long and strong; fifth hind toe without claw reaching to the end of the first phalanx of the fourth; pads, as usual, six in number, large and rounded. Mammæ 0-2=4; clitoris very long and slender. Tail about equal in length to the head and body, finely scaled (about 14 scales to the centimetre), uniformly thinly haired, blackish above, white below, the two colours intergrading on the sides.

Skull less different from that of ordinary rats than the very peculiar external characters would lead one to expect. Muzzle long and cylindrical, slightly concave upwards near the middle of the nasals. Interorbital region very broad, rounded above, its edges slightly beaded. Interparietal narrow antero-posteriorly. Projection of anterior zygoma-root medium. Anterior palatal foramina about the length of the molar series, and narrow, little open, not reaching backwards nearly to the level of $\underline{m.1}$. Bullæ small.

Dimensions of the type (an adult female, in spirit), before skinning :—

Head and body 148 millim.; tail 148; hind foot without claw 34; ear 26.5 × 18. Longest fore claw (above) 4.9, longest hind claw 4.6; heel to front of last foot-pad 16.5.

Skull: basal length 36.2; basilar length from henselion 33.7; greatest breadth 19.4; nasals 15.7 × 3.7; interorbital breadth 6.9, interparietal 3.5 × 9; diastema 12.5; palate

length from henselion 19·6; palatal foramina $6\cdot7 \times 2\cdot1$; length of upper molar series 6·6; breadth of palate outside $\frac{m.1}{8}$, inside $\frac{m.1}{4}\cdot2$.

Hab. Bonthain Peak, S. Celebes, 6000 feet.

Coll. A. H. Everett, October 1895.

This remarkable species differs so much in its external characters from ordinary rats that I have had great doubts whether a special genus or subgenus ought not to be made for its reception. As, however, there do not seem to be any very definite cranial or dental characters, I feel justified in leaving it for the present in the genus *Mus*.

Mus amuli, sp. n.

Size medium, about halfway between rat and mouse. Fur thickly spinous. General colour greyish brown, finely speckled with rufous. Belly white, the bases of the hairs grey; line of demarcation on sides well defined. Ears almost naked, laid forward in a spirit-specimen they reach to the middle of the eye. Palate-ridges as usual in the group, *i. e.* as figured by Jentink in *Mus Wichmanni**. Mammæ 2—2=8. Hands and feet pure white above; fifth hind toe reaching nearly to the end of the basal phalanx of the fourth; soles naked, with only 5 pads, the ordinary postero-external pad either suppressed or coalesced with that at the base of the fifth toe. Tail long, thinly haired, not pencilled; its scales large (10 to the centimetre), uniformly brown above and below, but the hairs below are white, although they do not hide the brown colour of the scales.

Skull narrow, with the zygomata little expanded. Interorbital space broad, its edges strongly rimmed, the raised ridges running backwards to the hinder edges of the parietals. Interparietal large. Anterior edge of the zygoma-root well projected forwards. Anterior palatine foramina reaching backwards just to the level of the front of $\frac{m.1}{1}$. Teeth rather small in proportion to the size of the skull.

Dimensions of the type (an adult male in spirit):—

Head and body 134 millim.; tail 172; hind foot 30; ear 17.

Skull: basal length 30·2; basilar length from henselion 28; greatest breadth 16·5; nasals $12\cdot8 \times 3\cdot9$; interorbital breadth 5·6, interparietal $5\cdot3 \times 10$; zygoma-root 3·5; diastema 9·7;

* Weber's Zool. Ergebn. Niederl. Ost-Indien, Mamm. p. 120, pl. x. fig. 7 (1890).

anterior palatine foramina 6.5×2.7 ; length of upper molar series 5.7.

Hab. Jampea Island, Saleyer group.

Coll. A. H. Everett, Dec. 1895.

A second specimen (female) has its head and body 125 millim., tail 169, hind foot 29.5, and ear 18.

This species seems to be most closely allied to *Mus Becarii*, Jent., from which it differs by its rather larger size or, at least, longer hind feet, the absence of any terminal pencilling to the tail, its grey-mixed belly, white feet, the normal projection forward of the zygoma-root, and the further extension backward of the anterior palatine foramina.

XXXIX.—*The Pholadidæ.*—II. *Note on the Organization of the Larva, and the Post-larval Development of Ship-worms.*

By C. P. SIGERFOOS*.

A YEAR ago I published † a note on the early stages of development of the Pholadidæ, in which the breeding-habits of *Pholas* and three species of ship-worms were described. During June and July of 1895 I again visited Beaufort, N. C., with the Johns Hopkins Marine Laboratory, and collected all stages of one of these species (*Xylotrya fimbriata*) from the small bivalve that has just become attached to the adult. As the eggs of this species are extruded freely into the water, I have not been able to observe the stages between the oldest larvæ raised in aquaria from artificially fertilized eggs and the attached stage, in which the development is much more advanced. For these intermediate stages it is necessary to resort to species which retain the embryos in the gills.

The free-swimming stage is reached in three hours, and in a day a well-developed shell has been formed. The young of Lamellibranchs develop but slowly, and though we have no direct observations as to the time the ship-worm larva is free-swimming, we may assume, I think, that it is at least a month, it may be two. During this time most of its energies are expended in locomotion, while after it has become attached it may devote all of its energies to forming its burrow and to securing food for itself; so that its rate of growth is very rapid. The larvæ become attached very

* From the 'Johns Hopkins University Circulars' for June 1896, pp. 87-89.

† 'Johns Hopkins University Circulars,' no. 119, June 1895; Ann. & Mag. Nat. Hist. [6] xvi. p. 233 (1895).